

Applicant : Robert W. Dixon
Serial No. : 09/894,518
Filed : June 27, 2001
Page : 2 of 17

Attorney's Docket No.: 17539-039001 / STL9981

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Previously presented) A method for handling multiple data streams in a disc drive, the method comprising steps of:
 - a) allocating a buffer size required by each data stream currently being handled;
 - b) utilizing the buffer sizes found in allocating step a) for corresponding data streams;
 - c) when an additional data stream is to be added, reallocating the buffer size required by each data stream including the additional data stream; and
 - d) when a data stream currently being handled is to be terminated, reallocating the buffer size required by each data stream that will remain after the data stream is terminated, wherein the allocating step a) comprises a step of:
 - a)(1) scaling a host data rate for a each data stream by an expression for a total time to fill or empty the buffer size allocated to all of the data streams being handled to create a set of simultaneous equations for the buffer sizes; and
 - a)(2) solving the simultaneous equations to find the buffer size to be allocated for each data stream.
2. (Canceled)
3. (Previously presented) The method of claim 1, wherein the scaling step a)(1) comprises a step of:
 - a)(1)(A) summing an expression for time to fill or empty the buffer size to be allocated for each data stream with a time to sequentially switch between each data

Applicant : Robert W. Dixon
Serial No. : 09/894,518
Filed : June 27, 2001
Page : 3 of 17

Attorney's Docket No.: 17539-039001 / STL9981

stream to find the expression of total time to fill or empty the buffer size allocated to all of the data streams being handled.

4. (Original) The method of claim 3, wherein the summing step a)(1)(A) comprises a step of:

a)(1)(A)(i) scaling a variable for the buffer size to be allocated for the first data stream by a disc rate assigned for the first data stream to find the expression for the time to fill or empty the buffer size to be allocated for the first data stream.

5. (Original) The method of claim 1, further comprising a step of:

e) comparing a sum of the buffer size dedicated for each data stream to the total buffer size available for use; and

f) detecting whether handling of the multiple data streams at a requested host data rate and disc data rate is possible from a result of comparing step e).

6. (Original) The method of claim 1, further comprising:

h) receiving, by the disc drive, one or more of the data streams; and

i) sending, by the disc drive, one or more of the data streams.

7. (Original) The method of claim 1 wherein a sum of buffer sizes allocated for the data streams is less than the total size of the buffer of the disk drive.

8. (Original) The method of claim 1, further comprising:

j) receiving, by the disc drive, data not in a stream; and

k) sending, by the disc drive, data not in a stream.

Applicant : Robert W. Dixon
Serial No. : 09/894,518
Filed : June 27, 2001
Page : 4 of 17

Attorney's Docket No.: 17539-039001 / STL9981

9. (Previously presented) A disc drive for handling multiple data streams, comprising:

one or more discs that store data;

a buffer that outputs data streams to the one or more discs and receives data streams from the one or more discs; and

a processor in electrical communication with the buffer, the processor being configured to dynamically allocate the size of the buffer used for each data stream being handled by the disc drive by computing a buffer size required by each data stream currently being handled, instructing the buffer to utilize the buffer sizes for corresponding data streams, recomputing the buffer size allocated to each data stream including an additional data stream when an additional data stream is to be added, and when a data stream will be terminated, recomputing the buffer size allocated to each data stream that will remain after a data stream is terminated, wherein the processor is configured to compute the buffer size required by each data stream currently being handled by scaling a host data rate for a first stream by an expression for a total time to fill or empty the buffer size that is dedicated to all of the data streams being handled to create a set of simultaneous equations for the buffer sizes and is further configured to solve the simultaneous equations to find the buffer size for each data stream.

10. (Canceled)

11. (Previously presented) The disc drive of claim 9, wherein the processor is configured to sum an expression for a time to fill or empty the buffer size to be dedicated for each data stream with a time to sequentially switch between each data stream to find the total time to fill or empty the buffer size dedicated to all of the data streams being handled.

Applicant : Robert W. Dixon
Serial No. : 09/894,518
Filed : June 27, 2001
Page : 5 of 17

Attorney's Docket No.: 17539-039001 / STL9981

12. (Original) The disc drive of claim 11, wherein the processor is configured to scale a variable for the buffer size to be dedicated for the first data stream by a disc rate assigned for the first data stream to find the expression for the time to fill or empty the buffer size to be dedicated for the first data stream.

13. (Original) The disc drive of claim 9, wherein the processor is further configured to compare a sum of the buffer sizes dedicated for each data stream to the total buffer size available for use, and detect whether handling of the multiple data streams at a requested host data rate and disc data rate is possible from a result of the comparison.

14. (Original) The disc drive of claim 9, wherein one or more of the data streams are received into the buffer at a host rate and are recorded to the disc at a disc rate, and wherein one or more of the data streams are received into the buffer at a second disc rate and are sent from the buffer at a second host rate.

15. (Original) The disc drive of claim 9, wherein the processor is configured to compute a sum of buffer sizes allocated for the data streams that is less than the total size of the buffer of the disc drive.

16. (Original) The disc drive of claim 9, wherein data not in a stream is received into the buffer and is recorded to the disc, and wherein data not in a stream is received into the buffer and is sent from the buffer contemporaneously with the buffer utilizing the buffer sizes allocated by the processor.

Applicant : Robert W. Dixon
Serial No. : 09/894,518
Filed : June 27, 2001
Page : 6 of 17

Attorney's Docket No.: 17539-039001 / STL9981

17. (Previously presented) A disc drive for handling multiple data streams, comprising:

a buffer that receives data from the multiple data streams; and
means for reallocating an amount of the buffer required for each data stream being handled whenever a new data stream is added or an existing data stream is terminated,
wherein the means for reallocating is configured to compute an amount of the buffer required by each data stream currently being handled by scaling a host data rate for a first stream by an expression for a total time to fill or empty the buffer amount dedicated to all of the data streams being handled to create a set of simultaneous equations for the buffer amounts and that is further configured to solve the simultaneous equations to find the buffer amount for each data stream.

18. (Canceled)

19. (Previously presented) The disc drive of claim 17, wherein the means for reallocating is configured to sum an expression for a time to fill or empty the buffer amount to be dedicated for each data stream with a time to sequentially switch between each data stream to find the total time to fill or empty the buffer amount dedicated to all of the data streams being handled.

20. (Original) The disc drive of claim 19, wherein the means for reallocating is configured to scale a variable for the buffer amount to be dedicated for the first data stream by a disc rate assigned for the first data stream to find the expression for the time to fill or empty the buffer amount to be dedicated for the first data stream.

Applicant : Robert W. Dixon
Serial No. : 09/894,518
Filed : June 27, 2001
Page : 7 of 17

Attorney's Docket No.: 17539-039001 / STL9981

21. (Original) The disc drive of claim 17, wherein the means for reallocating is further configured to compare a sum of the buffer amounts dedicated for each data stream to the total buffer amount available for use, and detect whether handling of the multiple data streams at a requested host data rate and disc data rate is possible from a result of the comparison.

22. (Original) The disc drive of claim 17, wherein one or more of the data streams are received into the buffer at a host rate and are recorded to the disc at a disc rate, and wherein one or more of the data streams are received into the buffer at a second disc rate and are sent from the buffer at a second host rate.

23. (Previously presented) The disc drive of claim 17, wherein the means for reallocating is configured to compute a sum of buffer amounts allocated for the data streams that is less than the total size of the buffer of the disc drive.

24. (Previously presented) The disc drive of claim 17, wherein data not in a stream is received into the buffer and is recorded to the disc, and wherein data not in a stream is received into the buffer and is sent from the buffer contemporaneously with the buffer utilizing the buffer amounts allocated by the means for reallocating.

25. (Currently Amended) A method of allocating a buffer to handle one or more data streams, the method comprising:

determining a buffer size for each data stream based on data rate information associated with for the one or more data streams; and

allocating space in the buffer to each of the data streams according to the determined buffer sizes.

Applicant : Robert W. Dixon
Serial No. : 09/894,518
Filed : June 27, 2001
Page : 8 of 17

Attorney's Docket No.: 17539-039001 / STL9981

26. (Previously presented) The method of claim 25, wherein the data rate at which at least one of the data streams is received into the buffer is different than the data rate at which that data stream is sent out of the buffer.

27. (Currently Amended) The method of claim 25, wherein determining the buffer size for each data stream further comprises evaluating a function of the data rates at which the buffer receives each data stream.

28. (Currently Amended) The method of claim 25, wherein determining the buffer size for each data stream further comprises evaluating a function of the data rates at which the buffer sends each data stream.

29. (Currently Amended) The method of claim 25, wherein determining the buffer size for each data stream further comprises evaluating a function of the data rates at which the buffer receives and sends each data stream.

30. (Currently Amended) The method of claim 25, further comprising:
receiving a request to change the data streams being handled by the buffer;
determining a buffer size for each data stream based on data rate information ~~associated~~
with for the data streams that the buffer would handle after the requested change takes effect; and
determining whether the sum of the determined buffer sizes is larger than the available space in the buffer.

31. (Previously presented) The method of claim 30, further comprising if the sum of the determined buffer sizes is not larger than the available space in the buffer, then allocating space in the buffer according to the determined buffer sizes for each of the data streams that the buffer will handle after the requested change takes effect.

Applicant : Robert W. Dixon
Serial No. : 09/894,518
Filed : June 27, 2001
Page : 9 of 17

Attorney's Docket No.: 17539-039001 / STL9981

32. (Previously presented) The method of claim 31, further comprising if the sum of the determined buffer sizes is larger than the available space in the buffer, then increasing the available space in the buffer by reducing at least one data rate associated with at least one of the data streams.

33. (Previously presented) The method of claim 31, further comprising if the sum of the determined buffer sizes is larger than the available space in the buffer, then increasing the available space in the buffer by reducing the number of data streams being handled by the buffer.

34. (Currently Amended) A method of allocating a buffer to handle one or more data streams, the method comprising:

receiving a request to change the data streams being handled by the buffer;

determining a buffer size for each data stream based on data rate information associated with for the data streams that the buffer would handle after the requested change takes effect;

determining whether the sum of the determined buffer sizes is larger than the available space in the buffer; and

if the sum of the determined buffer sizes is not larger than the available space in the buffer, then allocating space in the buffer according to the determined buffer sizes for each of the data streams that the buffer will handle after the requested change takes effect.

35. (Previously presented) The method of claim 34, wherein the buffer sizes for each data stream are determined before the requested change takes effect.

36. (Currently Amended) The method of claim 34, wherein the received request comprises a request to increase the number of data streams being handled by the buffer.

Applicant : Robert W. Dixon
Serial No. : 09/894,518
Filed : June 27, 2001
Page : 10 of 17

Attorney's Docket No.: 17539-039001 / STL9981

37. (Previously presented) The method of claim 34, wherein the received request comprises a request to change a data rate associated with any of the data streams being handled by the buffer.

38. (Previously presented) The method of claim 34, wherein if the sum of the determined buffer sizes is larger than the available space in the buffer, then increasing the available space in the buffer.

39. (Previously presented) The method of claim 38, wherein increasing the available space in the buffer comprises reducing at least one data rate associated with at least one of the data streams.

40. (Previously presented) The method of claim 38, wherein increasing the available space in the buffer comprises reducing the number of data streams being handled by the buffer.

41. (Previously presented) The method of claim 34, wherein determining the buffer size for each data stream comprises evaluating a function of the data rates at which the buffer would receive each data stream if the requested change takes effect.

42. (Previously presented) The method of claim 34, wherein determining the buffer size for each data stream comprises evaluating a function of the data rates at which the buffer would send each data stream if the requested change takes effect.

43. (Previously presented) The method of claim 34, wherein determining the buffer size for each data stream comprises evaluating a function of the data rates at which the buffer would receive and send each data stream if the requested change takes effect.

Applicant : Robert W. Dixon
Serial No. : 09/894,518
Filed : June 27, 2001
Page : 11 of 17

Attorney's Docket No.: 17539-039001 / STL9981

44. (Previously presented) The method of claim 34, wherein the data rate at which at least one of the data streams is received into the buffer is different than the data rate at which that data stream is sent out of the buffer.

45. (Currently Amended) A computer program product (CPP) tangibly embodied in an information carrier, the computer program product containing instructions that, when executed, cause a processor to perform operations to allocate a buffer to handle one or more data streams, the operations comprising:

determine a buffer size for each data stream based on data rate information ~~associated~~ with for the one or more data streams; and

allocate space in the buffer to each of the data streams according to the determined buffer sizes.

46. (Previously presented) The CPP of claim 45, wherein the buffer size for each data stream is determined based on a function of the data rates at which the buffer receives each data stream.

47. (Previously presented) The CPP of claim 45, wherein the buffer size for each data stream is determined based on a function of the data rates at which the buffer sends each data stream.

48. (Currently Amended) The CPP of claim 45, further comprising:

receive a request to change the data streams being handled by the buffer;

determine a second buffer size for each data stream based on data rate information ~~associated with~~ for the data streams that the buffer would handle after the requested change takes effect;

determine whether the sum of the determined second buffer sizes is larger than the available space in the buffer; and

Applicant : Robert W. Dixon
Serial No. : 09/894,518
Filed : June 27, 2001
Page : 12 of 17

Attorney's Docket No.: 17539-039001 / STL9981

if the sum of the determined buffer sizes is not larger than the available space in the buffer, then allocate space in the buffer according to the determined buffer sizes for each data stream that the buffer will handle after the requested change takes effect.

49. (Currently Amended) A system for handling one or more data streams, the system comprising:

a buffer operably configured to handle a plurality of data streams, each data stream being received by the buffer and retransmitted by the buffer;

means for determining a buffer size for each data stream based on data rate information associated with for the one or more data streams; and

means for allocating space in the buffer to each of the data streams according to the determined buffer sizes.

50. (Previously presented) The system of claim 49, wherein the buffer size for each data stream is determined based on evaluating a function of the data rates at which the buffer receives each data stream.

51. (Previously presented) The system of claim 49, wherein the buffer size for each data stream is determined based on evaluating a function of the data rates at which the buffer sends each data stream.

52. (Currently Amended) A data handling system, comprising:
a buffer to handle data streams;
a processor coupled to the buffer; and
a memory containing a program of instructions that, when executed by the processor, cause the processor to perform operations to allocate available space in the buffer among data streams, the operations comprising:

Applicant : Robert W. Dixon
Serial No. : 09/894,518
Filed : June 27, 2001
Page : 13 of 17

Attorney's Docket No.: 17539-039001 / STL9981

determine a buffer size for each data stream based on data rate information associated with for the one or more data streams; and
allocate space in the buffer to each of the data streams according to the determined buffer sizes.

53. (Previously presented) The data handling system of claim 52, wherein the buffer size for each data stream is determined based on a function of the data rates at which the buffer receives each data stream.

54. (Previously presented) The data handling system of claim 52, wherein the buffer size for each data stream is determined based on a function of the data rates at which the buffer sends each data stream.

55. (Previously presented) The data handling system of claim 52, wherein the buffer is structured and configured to handle data streams between one or more source devices and one or more receiver devices.

56. (Currently Amended) The data handling system of claim 52, the operations further comprising:

receive a request to change the data streams being handled by the buffer;

determine a second buffer size for each data stream based on data rate information associated with for the data streams that the buffer would handle after the requested change takes effect;

determine whether the sum of the determined second buffer sizes is larger than the available space in the buffer; and

if the sum of the determined buffer sizes is not larger than the available space in the buffer, then allocate space in the buffer according to the determined buffer sizes for each data stream that the buffer will handle after the requested change takes effect.

Applicant : Robert W. Dixon
Serial No. : 09/894,518
Filed : June 27, 2001
Page : 14 of 17

Attorney's Docket No.: 17539-039001 / STL9981

57. (New) A method of allocating a buffer to handle one or more data streams, the method comprising:

determining a buffer size for each data stream to be handled by the buffer, wherein the buffer size for each data stream is sufficient to handle the corresponding data stream, and each determined buffer size is determined based on a function of one or more times to switch between the data streams; and

allocating space in the buffer to each of the data streams according to the determined buffer sizes.

58. (New) The method of allocating claim 57, wherein each determined buffer size is further determined based on a function of information about a data rate into the buffer.

59. (New) The method of allocating claim 57, wherein each determined buffer size is further determined based on a function of information about a data rate out of the buffer.

60. (New) The method of allocating claim 57, wherein each determined buffer size is further determined based on a function of information about a data rate into the buffer and information about a data rate out of the buffer.